

# Challenges for LA in Europe: Contributions from SNOLA

María Jesús Rodríguez-Triana<sup>1</sup>, Ruth Cobos<sup>2</sup>, Pedro Manuel Moreno-Marcos<sup>3</sup>,  
Antonio Balderas<sup>4</sup> and Alejandra Martínez-Monés<sup>1,\*</sup>

<sup>1</sup>Department of Computer Science / GSIC-EMIC, Universidad de Valladolid, Spain

<sup>2</sup>Department of Computer Engineering, Universidad Autónoma de Madrid, Spain

<sup>3</sup>Department of Telematics Engineering, Universidad Carlos III de Madrid, Spain

<sup>4</sup>Department of Computer Engineering, Universidad de Cádiz, Spain

## Abstract

The Spanish Network of Learning Analytics (SNOLA) has served as the meeting point of researchers working on learning analytics in Spain during the last decade. A natural step towards extending its outreach was to collaborate with networks and researchers in other regions, such as Latin America and Europe. A major milestone of this collaboration was the celebration of LASI Europe 2024 in cooperation with LASI Nordic and the Special Interest Group (SIG) on Europe by SoLAR (Society for Learning Analytics Research). This paper provides a brief overview of the activity of SNOLA and the main future directions for learning analytics in Europe that were identified in this event.

## Keywords

SNOLA, learning analytics, research networks, european perspective

## 1. Introduction

New research fields often emerge and evolve at the intersection of established disciplines, boosted by the identification of new opportunities and the need to solve complex problems. At the social level, the development of research fields is driven by interconnected networks of people and technology [1].

The field of Learning Analytics (LA) exemplifies these two trends well. It emerged partially as a consequence of the interest of a number of researchers who were working in related research areas (i.e., Artificial Intelligence in Education - AIED, Computer Supported Collaborative Learning - CSCL, Educational Data Mining - EDM, or Technology Enhanced Learning - TEL) and is nowadays trying to integrate new opportunities from emergent fields such as Generative AI. However, it has rapidly developed as a result of the concerted efforts of various research networks.

The Society for Learning Analytics Research (SOLAR) is the most influential of these, uniting researchers and stakeholders in LA globally [2]. Alongside the creation of SOLAR, several regional networks were established in the early 2010s to promote LA research at more local levels, like LALA (Latin-American Network of Learning Analytics) in Latin America [3] or SNOLA (Spanish Network on Learning Analytics) in Spain [4]. Other networks are organised around specific events, like Nordic LASI, in charge of organising local LASI events in the Nordic countries.

At the European level, various efforts have been made to advance LA research from a European perspective. One example is the Learning Analytics Community Exchange (LACE), which made significant contributions between 2015 and 2017 [5] and continues to collaborate with the Society for Learning Analytics Research (SOLAR) as a Special Interest Group <sup>1</sup>. A more recent initiative is the organisation of LASI Europe 2024 by SNOLA, in collaboration with LACE and Nordic LASI. This event aimed to bring together European researchers and groups to identify challenges and opportunities in LA research across Europe.

---

*Learning Analytics Summer Institute Spain (LASI Spain) 2025, May 26<sup>th</sup> – 27<sup>th</sup>, 2025, Vitoria, Spain*

\*Corresponding author.

ORCID: 0000-0001-8639-1257 (M. J. Rodríguez-Triana); 0000-0002-3411-3009 (R. Cobos); 0000-0003-0835-1414 (P. M. Moreno-Marcos); 0000-0003-0026-7410 (A. Balderas); 0000-0003-3201-0345 (A. Martínez-Monés)



© 2025 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

<sup>1</sup><https://www.solaresearch.org/community/sigs/lace-sig/>

This paper presents SNOLA, as a local network dedicated to LA that has been active for over a decade, and shares the outcomes of the panel discussion held at LASI Europe 2024 on the challenges and future trends in Learning Analytics across Europe.

## 2. SNOLA - The Spanish Network of Learning Analytics

The Spanish Network of Learning Analytics (SNOLA)<sup>2</sup> is composed of researchers dedicated to learning analytics, from 15 Spanish research groups, and includes several associate members from other universities. The background of its founding members was geared towards technical and engineering disciplines, but the network is incorporating researchers from psychological and pedagogical backgrounds that enable an interdisciplinary perspective and that have increased its outreach. As a whole, the network brings together the work of the main groups related to this topic in Spain.

SNOLA was established informally in 2013 by Spanish researchers interested in the interchange of knowledge and expertise in the area of LA. Its mission was to create synergies and explore possibilities of collaboration among them, as well as becoming a reference in the field of LA in Spain. SNOLA also aimed to promote the connection between Spanish researchers with other international networks in different regions of the world, including Latin America, Australia, US and Europe. The work of the network was reinforced by its official recognition as a Thematic Network of Excellence by the Spanish Government in 2015. This recognition and financial support was renewed in 2020 and 2023, and remains active now.

The main activity of the network has been the organisation of scientific events that have served to disseminate the work of the network and to extend the connections to other researchers, both in Spain and at an international level. Since 2013, SNOLA has organised 13 editions of the Spanish Learning Analytics Summer School (LASI Spain) that have taken place annually until 2025 [6]. A major milestone following this trend was the organisation of a European-level event in 2024, LASI Europe 2024<sup>3</sup> (see next section). Most of these events have counted with the participation, as guest speakers, of researchers of maximum relevance in the area, together with the members of the network and several collaborators. The papers presented at these events have served to share and advance the state of LA research at national and international levels. Furthermore, the inclusion of doctoral consortiums, such as the Doctoral Consortium at LASI Europe 2024 [7], has played a pivotal role in fostering the next generation of Learning Analytics researchers. These events provide invaluable platforms for early-stage researchers to present their work, receive feedback from experts, and engage in fruitful discussions that are essential for the advancement of the field.

Likewise, the network has different channels for the dissemination of LA research to different audiences. It organises periodic webinars which remain available on its website as part of the resources offered to its visitors.

During all these years, SNOLA members have collaborated in the elaboration of joint studies on the state of LA research in our country [4], or on the expectations of university faculty staff [8], taking advantage of the network's outreach.

These networking activities have helped to extend the network to other forums, such as the events organised by the e-Madrid network, the organisation of the special track on LA in the TEEM conference (continuously from 2013 to 2025), and the organisation of workshops at other conferences, like WLACISTI, WAPLA and EDUCON (IEEE Global Engineering Education Conference).

This intense activity has been made possible by the existence of the network itself. The communication and coordination channels established by SNOLA have allowed for the seamless and efficient formation of working teams to organise these events—something that would not have been feasible without the network and its official recognition by the Spanish Government. This recognition provides modest financial support, which facilitates the organisation of activities and encourages members to pursue the network's goals.

---

<sup>2</sup><https://snola.es>

<sup>3</sup><https://lasieurope24.snola.es/>

### 3. Challenges and opportunities for LA in Europe: first results from LASI Europe 2024

A specific session took place in LASI Europe 2024, involving a first introduction to groups and projects across the European landscape. Eight research groups<sup>4</sup> and ten projects<sup>5</sup> were presented, together with pointers to future plans and topics for further discussion. Following this introductory session, we extracted a list of 17 topics emerging from the future plans of the group and project presentations (see Table 1). Based on the audience's interest, round tables around 4 main topics of discussion were set up. These topics were: (i) multimodal LA (MMLA); (ii) explainable AI and generative AI in education; (iii) microcredentials and LA; and (iv) AI/LA for Learning Design.

**Table 1**

Topics emerging from the LA group and project future plans. In *italics* those selected for the round tables

Topics	Frequency
<i>Explainable AI / Generative AI in Education / LLM / ML</i>	6
Ethics and privacy in current LA situation & GDPR (at all educational levels)	3
Adoption of LA and integration of LA in traditional pedagogical environments	3
<i>Multimodal LA &amp; Biometric data / Multimodal Educational Data</i>	2
Advancement of predictive models	1
<i>EDM/LA in Microcredentials</i>	1
Strategies to develop evaluative judgement with LA/AI	1
Teacher professional learning, skill development and LA-enhanced environment	1
Need to introduce LA to stakeholders	1
Pedagogical models integrated into LA tools	1
<i>AI/LA for learning design</i>	1
Are we really improving education with LA?	1
Personalised interventions for learners	1
LA & AIED to preserve teacher agency, wellbeing, learning and the future of productive jobs	1
LA in Secondary education	1
Single-person/longitudinal analytics	1
Trends and advances of LA for assessment	1

All working groups were asked to consider how the European context shapes their respective topics. Throughout the discussions, participants repeatedly emphasised the impact of European regulations, such as the GDPR, consent requirements and the AI Act. While these regulations are designed to protect rights, they often present practical challenges to implementation. Beyond legal compliance, additional region-specific aspects also emerged. For instance, discussions on the Multilingual Master's Label addressed the implications of linguistic diversity and shared cultural values, while the debate on micro-credentials noted discrepancies between the EU's definition and international standards. Broader educational priorities in Europe, including a focus on formative assessment, collaborative learning and equity and inclusion, were also recurring themes. The key takeaways from each topic are summarised below.

#### 3.1. Multimodal LA

In the field of Multimodal Learning Analytics (MMLA), the potential to enhance learning understanding by combining multiple data streams, beyond traditional on-screen interactions, is emphasised. This diversity of data creates opportunities to enhance evaluation, promote inclusion, and extend the reach of LA to broader audiences. However, the complexity of human behaviour and the challenges of scalability,

<sup>4</sup><https://docs.google.com/presentation/d/1LT0anJuJKL6SzXrxGj8v1UHD6YethZCJ/edit?usp=sharing&ouid=115328888807362268202&rtpof=true&sd=true>

<sup>5</sup>[https://docs.google.com/presentation/d/1AuqgcRir8EeL1si\\_Ts2LxefVIAaWcwbZ/edit?usp=sharing&ouid=115328888807362268202&rtpof=true&sd=true](https://docs.google.com/presentation/d/1AuqgcRir8EeL1si_Ts2LxefVIAaWcwbZ/edit?usp=sharing&ouid=115328888807362268202&rtpof=true&sd=true)

privacy and contextual adaptation limit its practical application. In the European context, factors such as the GDPR [9], linguistic diversity, and an emphasis on socio-cultural values impose additional barriers, but also provide specific guidance on the ethical and contextual development of MMLA [10].

### **3.2. Explainable AI and Generative AI in Education**

Key opportunities for generative AI and Large Language Models (LLMs) have been identified, including personalised learning, the automatic generation of educational content, and improved feedback [11]. However, their sustainable adoption in educational settings is hindered by issues such as the reliability of the models, a lack of algorithmic transparency and insufficient institutional support, particularly with regard to European regulatory compliance.

### **3.3. Micro-credentials and LA**

Micro-credentials offer a promising framework for identifying learning trajectories and competency gaps, as well as aligning with standardised skills frameworks [12]. However, the lack of consensus on their definition, inconsistent alignment across platforms, and the requirement for robust assessment mechanisms present significant challenges. While the European Union has demonstrated a clear political and financial commitment to promoting micro-credentials, the global heterogeneity in their conceptualisation complicates comparability and interoperability [13].

### **3.4. AI/LA for Learning Design**

Finally, the use of LA and AI in learning design highlights a growing interest in supporting teachers during the authoring process and in adapting and orchestrating learning activities. Automation and pedagogical reflection, particularly through generative AI, are presented as means of enhancing teaching practice and teacher education. However, the scarcity of high-quality educational datasets and the challenge of conceiving AI as a partner rather than a substitute for teachers remain crucial issues, particularly in the intensely regulated European context [14].

## **4. Final reflections**

An important factor to consider when establishing a new (sub-)community, like SNOLA, is its sustainability. This paper has introduced the activity carried out by this network, which has become a key reference in Learning Analytics research in Spain, thanks in part to the financial support from the Spanish research agency.

Regarding the future organisation of events like LASI Europe, which aim to foster a European LA perspective and community, this topic was discussed at LASI Europe 2024. The Program Committee chairs proposed several ideas for future initiatives. One suggestion was to hold a new LASI Europe event in a different region of Europe, while others focused on exploring collaborations with European-level associations such as EATEL. A key concern for ensuring the sustainability of these efforts is to coordinate them in a way that allows researchers interested in this field to manage the personal and financial commitments required for participation and contribution. In that sense, funding from the Spanish research agency has been crucial for the sustainability of the LASI Spain event, and maintaining and obtaining further funding would be needed for these events at National or European level.

## **Acknowledgments**

This work has been partially funded by grants: PID2020-112584RB-C32 and RED2022-134284-T (funded by MICIU/AEI/10.13039/501100011033), PID2023-146692OB-C32 (financed by

MICIU/AEI/10.13039/501100011033 and by ERDF, EU), RYC2022-037806-I (funded by MCI-U/AEI/10.13039/501100011033 and ESF+) and TED2021-131787B-I00 (financed by MICINN). The authors thank the contributions from all SNOLA members and from all the participants in LASI Europe 2024.

## References

- [1] B. Latour, *Reassembling the social. An introduction to actor-network-theory*, Oxford University Press, Oxford, 2005. URL: <https://doi.org/10.1093/oso/9780199256044.001.0001>.
- [2] Society for Learning Analytics Research, *What is learning analytics?*, 2023. URL: <https://www.solaresearch.org/about/what-is-learning-analytics>, Accessed: 2025-05-25.
- [3] C. Cechinel, X. Ochoa, H. Lemos dos Santos, J. B. Carvalho Nunes, V. Rodés, E. Marques Queiroga, Mapping learning analytics initiatives in latin america, *British Journal of Educational Technology* 51 (2020) 892–914. URL: <https://doi.org/10.1111/bjet.12941>.
- [4] Martínez-Monés, Y. Dimitriadis, E. Acquila Natale, A. Álvarez, M. Caeiro Rodríguez, R. Cobos Pérez, M. Á. Conde González, F. J. García Peñalvo, D. Hernández Leo, I. Menchaca Sierra, P. J. Muñoz Merino, S. Ros, T. Sancho Vinuesa, Achievements and challenges in learning analytics in Spain: The view of SNOLA, *RIED. Revista Iberoamericana de Educación a Distancia* 23 (2020) 187–212. URL: <https://doi.org/10.5944/ried.23.2.26541>.
- [5] R. Ferguson, D. Clow, D. Griffiths, A. Brasher, Moving forward with learning analytics: Expert views, *Journal of Learning Analytics* 6 (2019) 43–59. URL: <https://doi.org/10.18608/jla.2019.63.8>.
- [6] A. Balderas, A. Martínez-Monés, J.-M. Dodero, S. Ros, Preface of the Learning Analytics Summer Institute Spain 2023 (LASI Spain 2023), *CEUR Workshop Proceedings* 3542 (2023) 1–6. URL: <https://ceur-ws.org/Vol-3542/xpreface.pdf>.
- [7] Y. Dimitriadis, R. Cerezo, A. Balderas, A. Martínez-Monés, D. Spikol, Preface of the Doctoral Consortium of the Learning Analytics Summer Institute Europe 2024 (LASI Europe 2024 DC), *CEUR Workshop Proceedings* 3738 (2024) 1–6. URL: <https://ceur-ws.org/Vol-3738/xpreface.pdf>.
- [8] O. Bordies, P. Muñoz-Merino, A. Martínez-Monés, Y. Dimitriadis-Damoulis, D. Hernández-Leo, A. Álvarez, M. Caerio-Rodríguez, R. Cobos, S. Ros, T. Sancho-Vinuesa, Expectations about learning analytics after the COVID-19 Pandemic: A study of 7 Spanish universities, in: *Proceedings of LASI Spain 2023, Madrid, 2023*, pp. 1–7. URL: <https://ceur-ws.org/Vol-3542/paper5.pdf>.
- [9] D. Amo-Filva, M. Alier, D. Fonseca, F. J. García-Peñalvo, M. J. Casañ, Learning analytics icons: Easy comprehension of data treatment, *International Journal of Interactive Multimedia and Artificial Intelligence* (2024). URL: <http://dx.doi.org/10.9781/ijimai.2024.04.001>, in Press.
- [10] H. Alwahaby, M. Cukurova, Navigating the ethical landscape of multimodal learning analytics: A guiding framework, in: S. Caballé, J. Casas-Roma, J. Conesa (Eds.), *Ethics in Online AI-based Systems, Intelligent Data-Centric Systems*, Academic Press, 2024, pp. 25–53. URL: <https://doi.org/10.1016/B978-0-443-18851-0.00014-7>.
- [11] U. Mittal, S. Sai, V. Chamola, D. Sangwan, A comprehensive review on generative ai for education, *IEEE Access* 12 (2024) 142733–142759. URL: <https://doi.org/10.1109/ACCESS.2024.3468368>.
- [12] S. Öncü, M. Çolakoğlu, H. Cigdem, Leveraging ai-managed learning analytics and micro-credentials for enhanced student engagement, in: G. Durak, S. Çankaya (Eds.), *Integrating Micro-Credentials With AI in Open Education*, IGI Global Scientific Publishing, 2025, pp. 133–152. URL: <https://doi.org/10.4018/979-8-3693-5488-9.ch007>.
- [13] D. Griffiths, D. Burgos, S. Aceto, Open education and alternative digital credentials in europe, *International Review of Research in Open and Distributed Learning* 25 (2024) 89–108. URL: <https://doi.org/10.19173/irrodl.v25i1.7412>.
- [14] M. Cukurova, The interplay of learning, analytics and artificial intelligence in education: A vision for hybrid intelligence, *British Journal of Educational Technology* 56 (2025) 469–488. URL: <https://doi.org/10.1111/bjet.13514>.

## **Declaration on Generative AI**

The author(s) have not employed any Generative AI tools.